



Summary of the USOS VIIP Findings

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The Numbers



- Completed 42 ISS missions
- Sentinel case occurred in 2005 – optic disc edema and a cotton wool spot
- Initiated *some* VIIP related testing in 2008 (Exp 18)
 - Inconsistent testing until Feb 2010 (Exp 23) when Eye MED B 1.10 came into effect
 - Improved imaging hardware (Fundoscope & OCT) flew in 2013
- Clinical Practice Guideline (CPG) approved in 2010
 - Case definition included a classification scheme (0-4)
 - Many issues with this CPG
- New Clinical Care Algorithm in April 2014
 - Case definition no longer classifies – focusses on findings
 - Expands treatment options



USOS Crewmembers



- Individuals that have completed ISS missions
 - 48 US of which 30 have been evaluated for VIIP
 - 13 Int'ls of which 9 have had complete testing
- Repeat 6 (8 if you count previous MIR missions)
- Of crewmembers tested, only 5 had no prior space flight experience.



Findings To Date (ISS/USOS)

- Elevated Intracranial Pressure
 - <20 cm H₂O: 2
 - >20 cm H₂O: 2
 - >25 cm H₂O: 3
- Optic disc edema/papilledema
 - Frisen Grade 1 or higher: 9
 - Subclinical: 5
- Choroidal folds
 - OCT or Fundoscopy: 12
- Cotton wool spot
 - 5*

*1 Roth Spot appeared 193 days post-flight

- Globe flattening

	U/S	MRI
Pre-flight	7	10
Post-flight	14	22

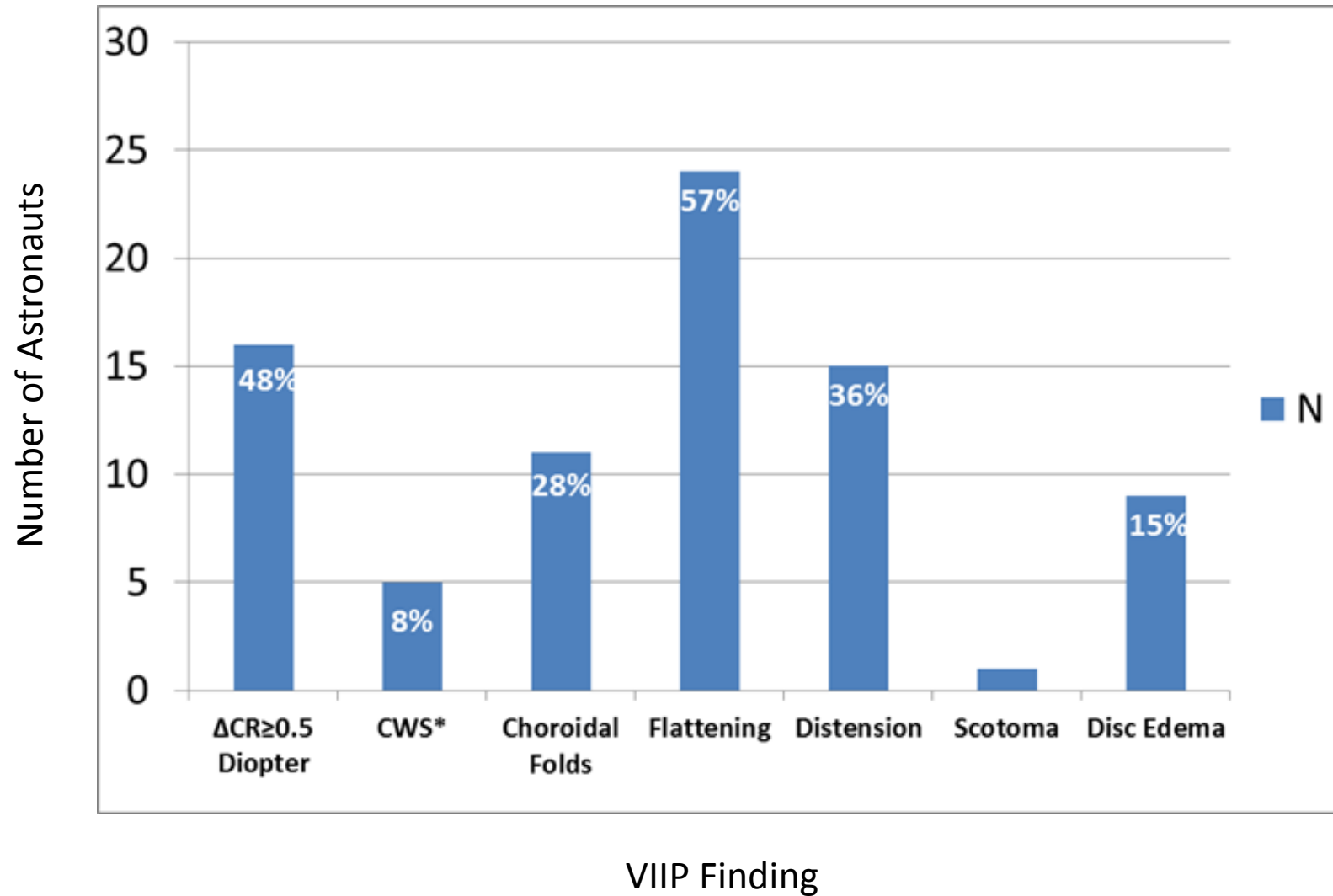
- Optic Nerve Sheath Distention (Diameter):

	U/S	MRI
Pre-flight	0.61	0.64
Post-flight	0.62	0.65

- Refractive error change – post flight
 - >0.5 Diopter: 9
- Scotoma – in flight
 - 1



Summary Graph





ONSD – MRI Guidelines Document

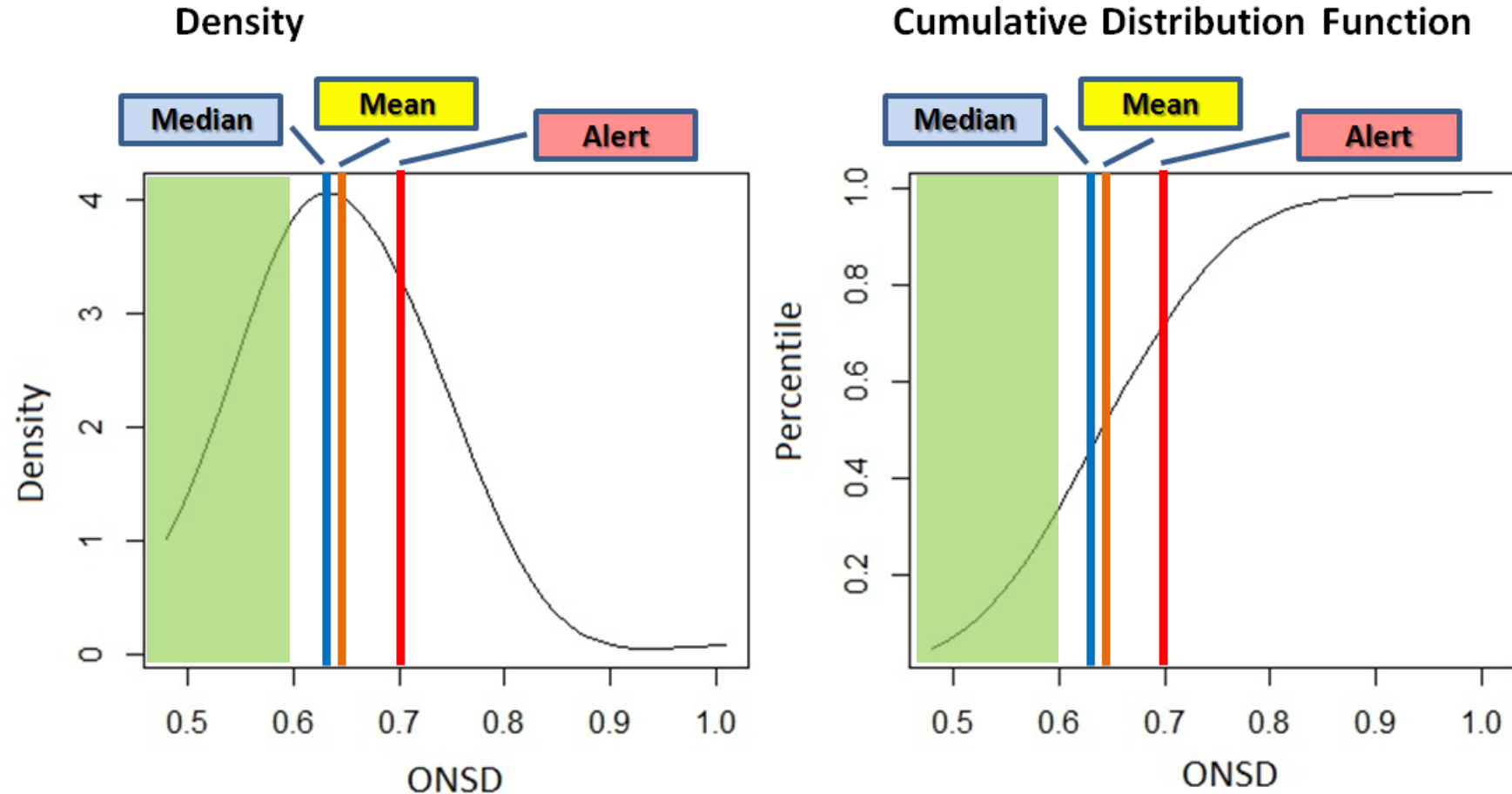
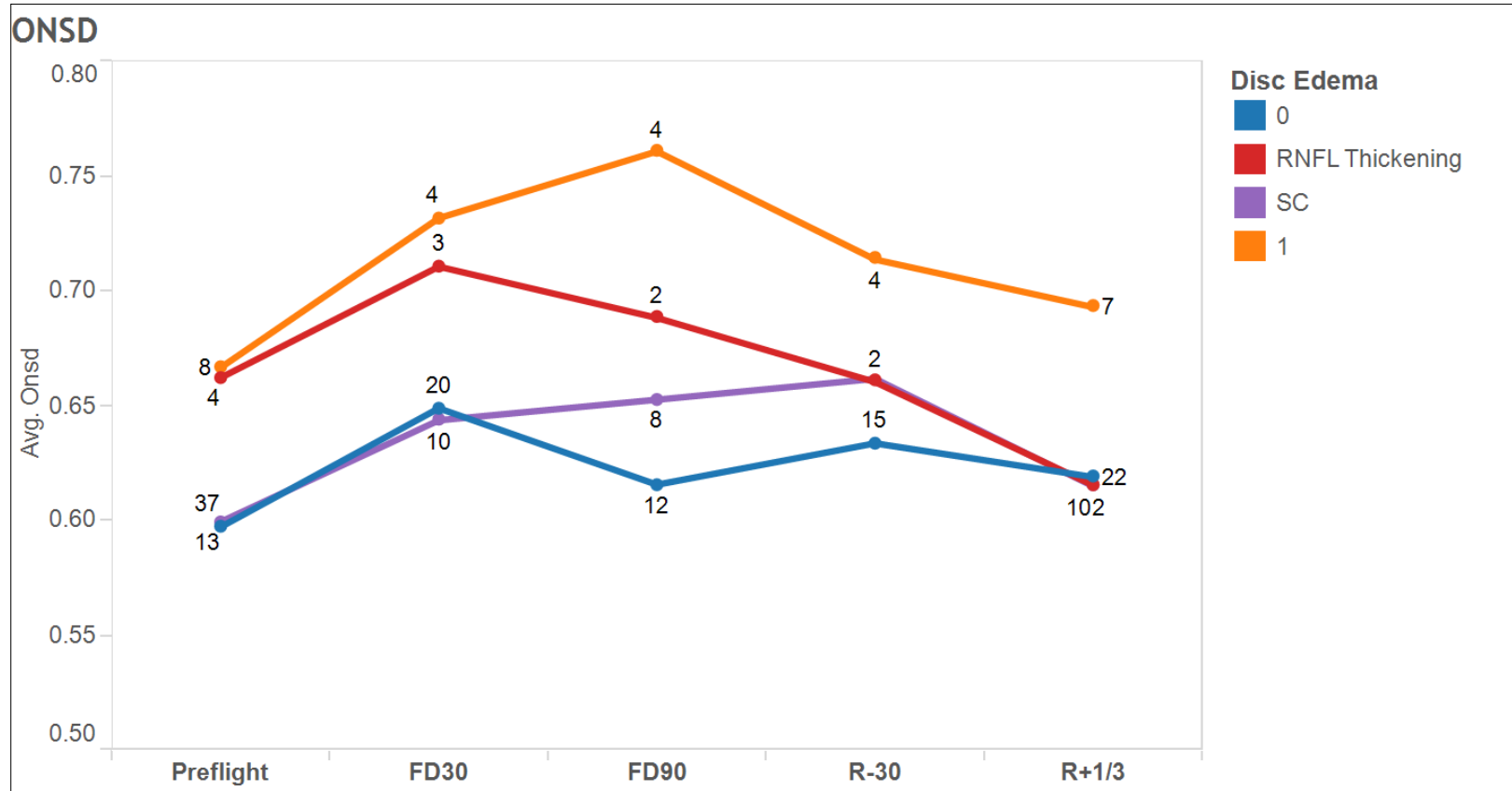


Figure 1. Distribution of ONSD values in the astronaut cohort (Pre-flight, in 42 pairs). The green area corresponds to the terrestrial published evidence with a “cut-off” value for elevated ICP at 0.59 cm. This value cannot be directly used for the astronaut cohort and is provided as part of background information.

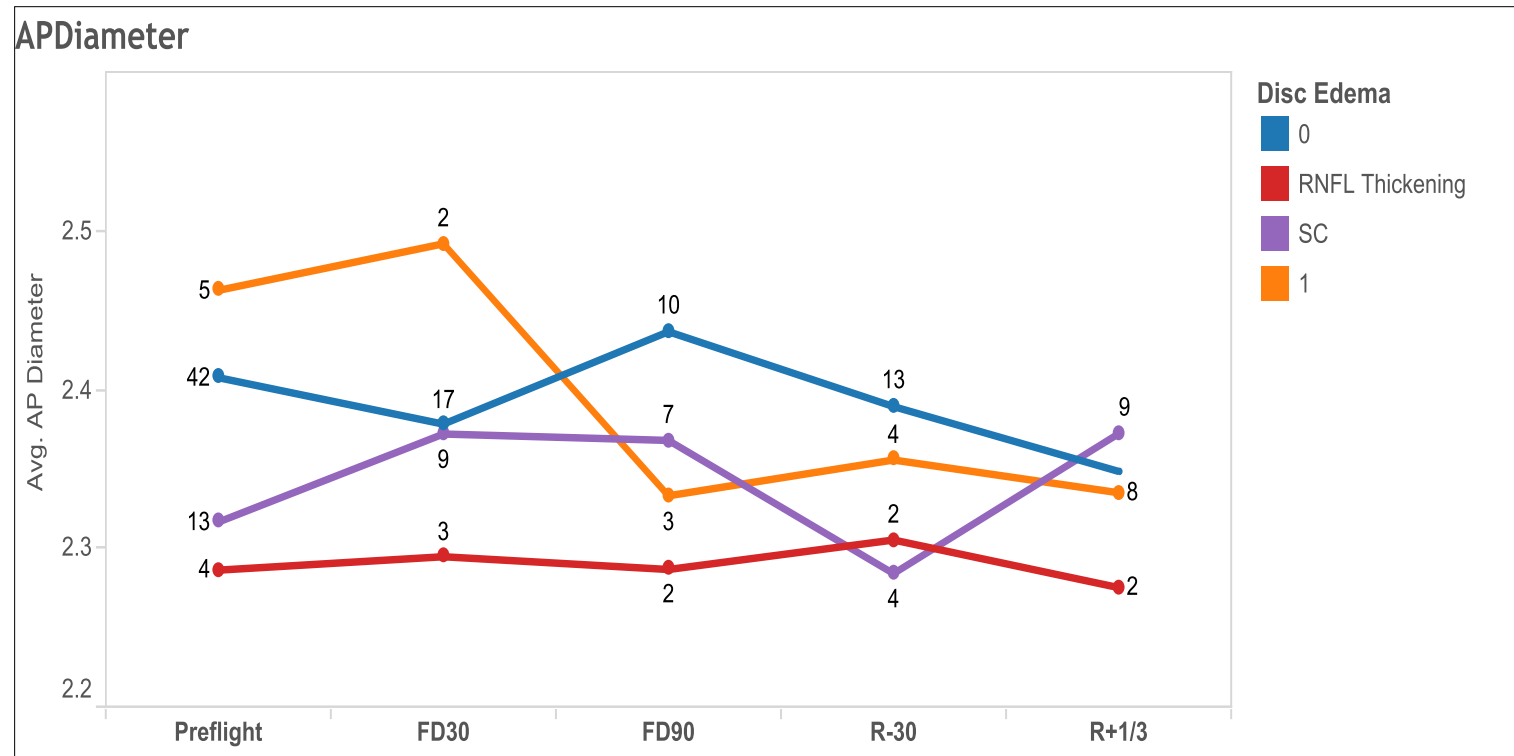


ONSD(U/S) vs Post-flight Disc Edema Diagnosis



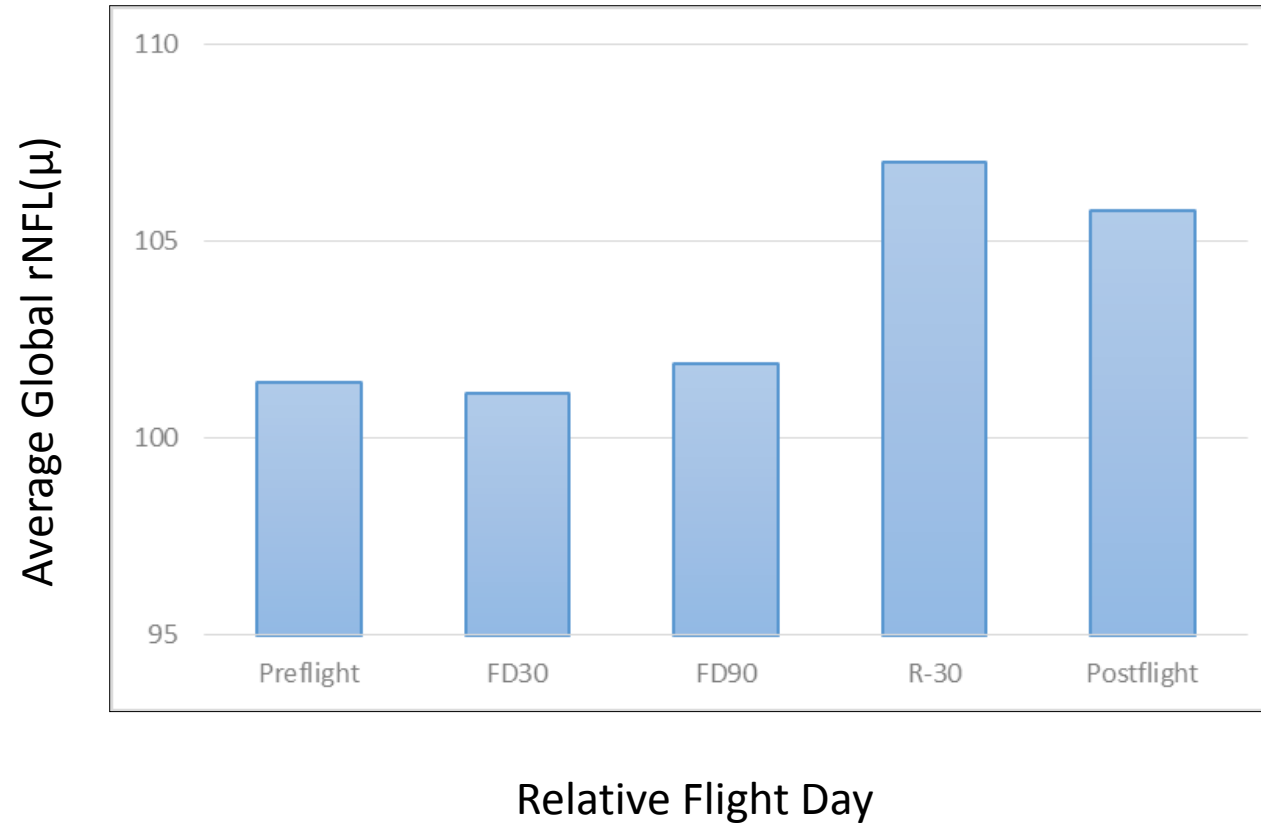


AP Diameter(U/S) vs Post-flight Disc Edema Diagnosis



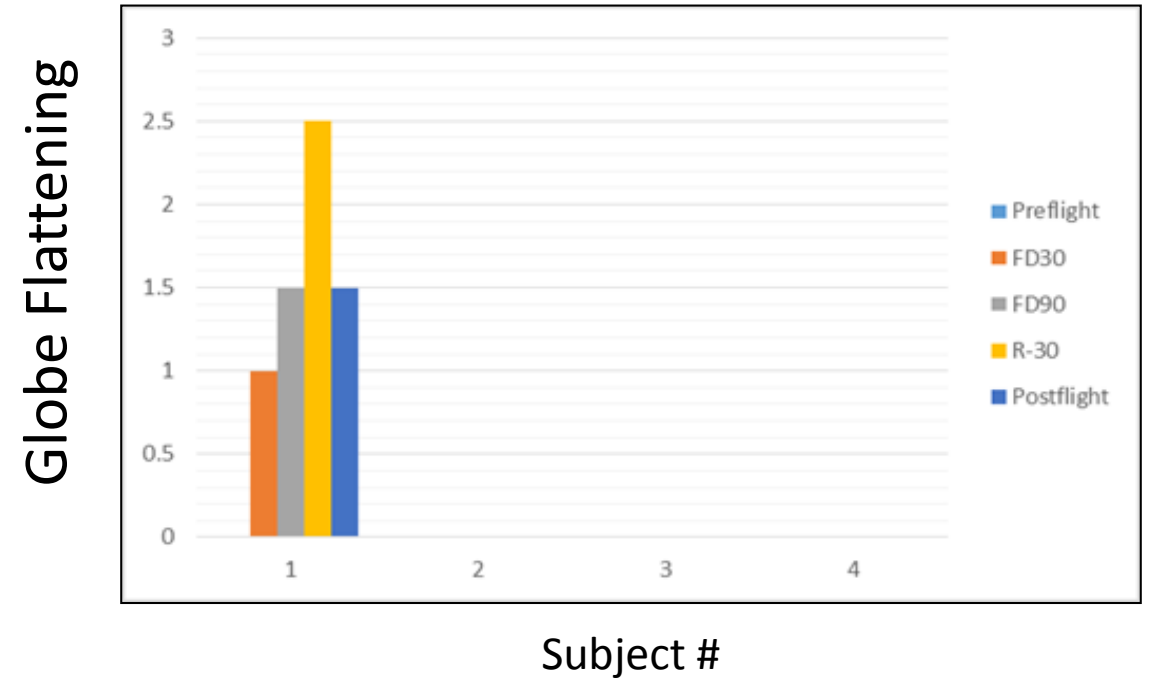
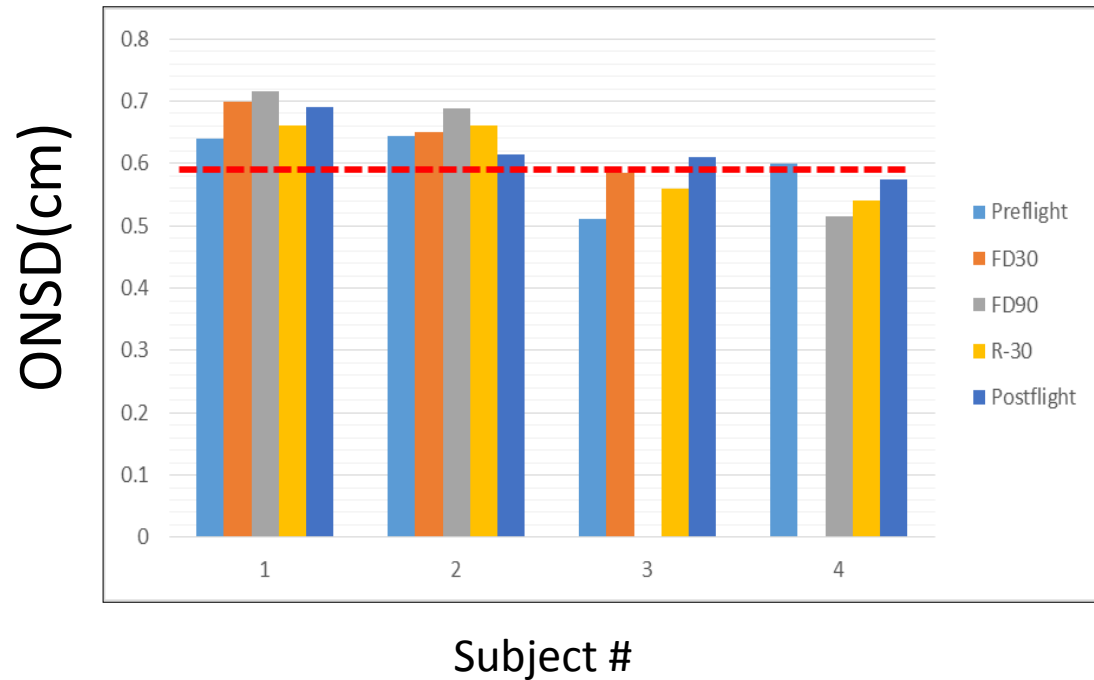


In-flight OCT (n=6)





Space-flight Naïve: Ultrasound

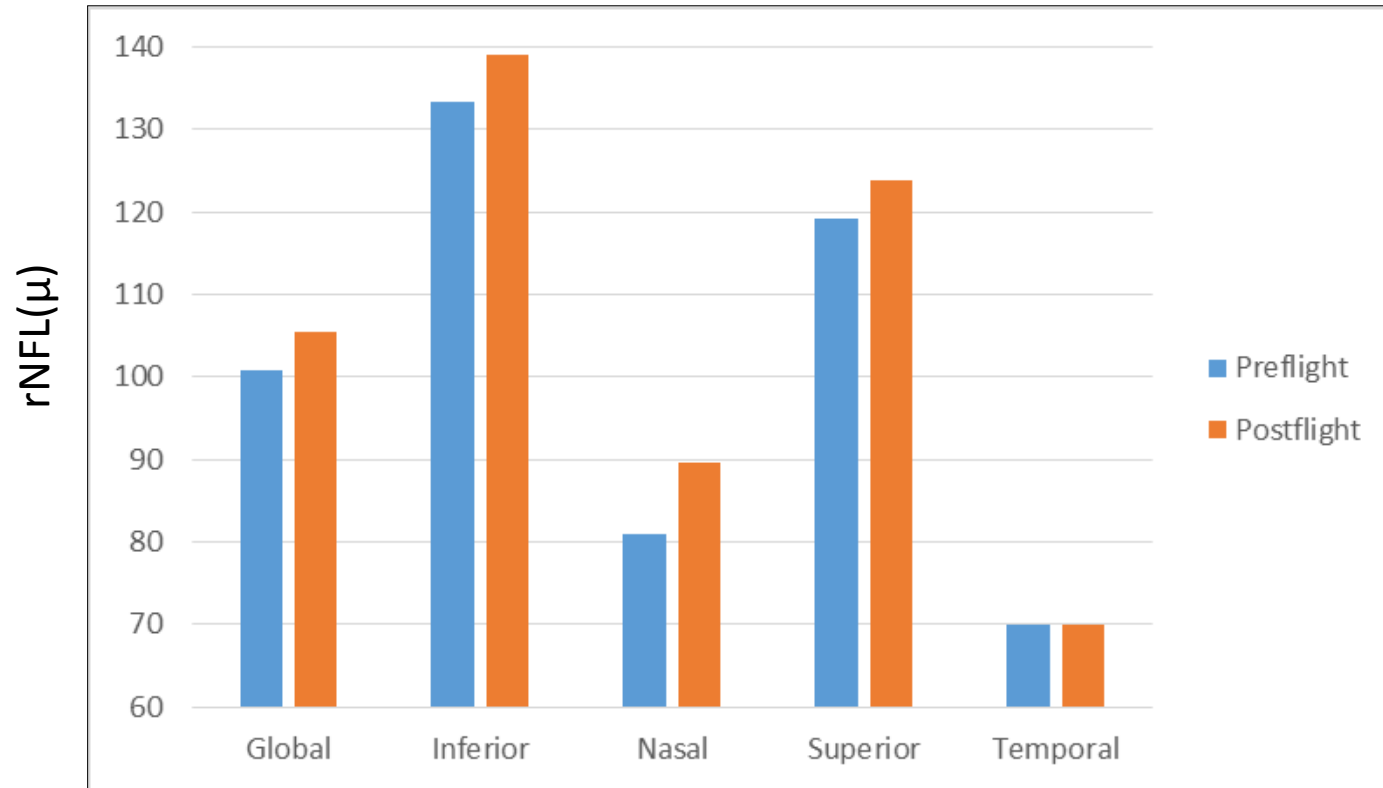


Note: Scale from 0 to 3 is used (None, Mild, Moderate, Severe) corresponds to vertical axis



Space-flight Naïve: OCT

Total RNFL

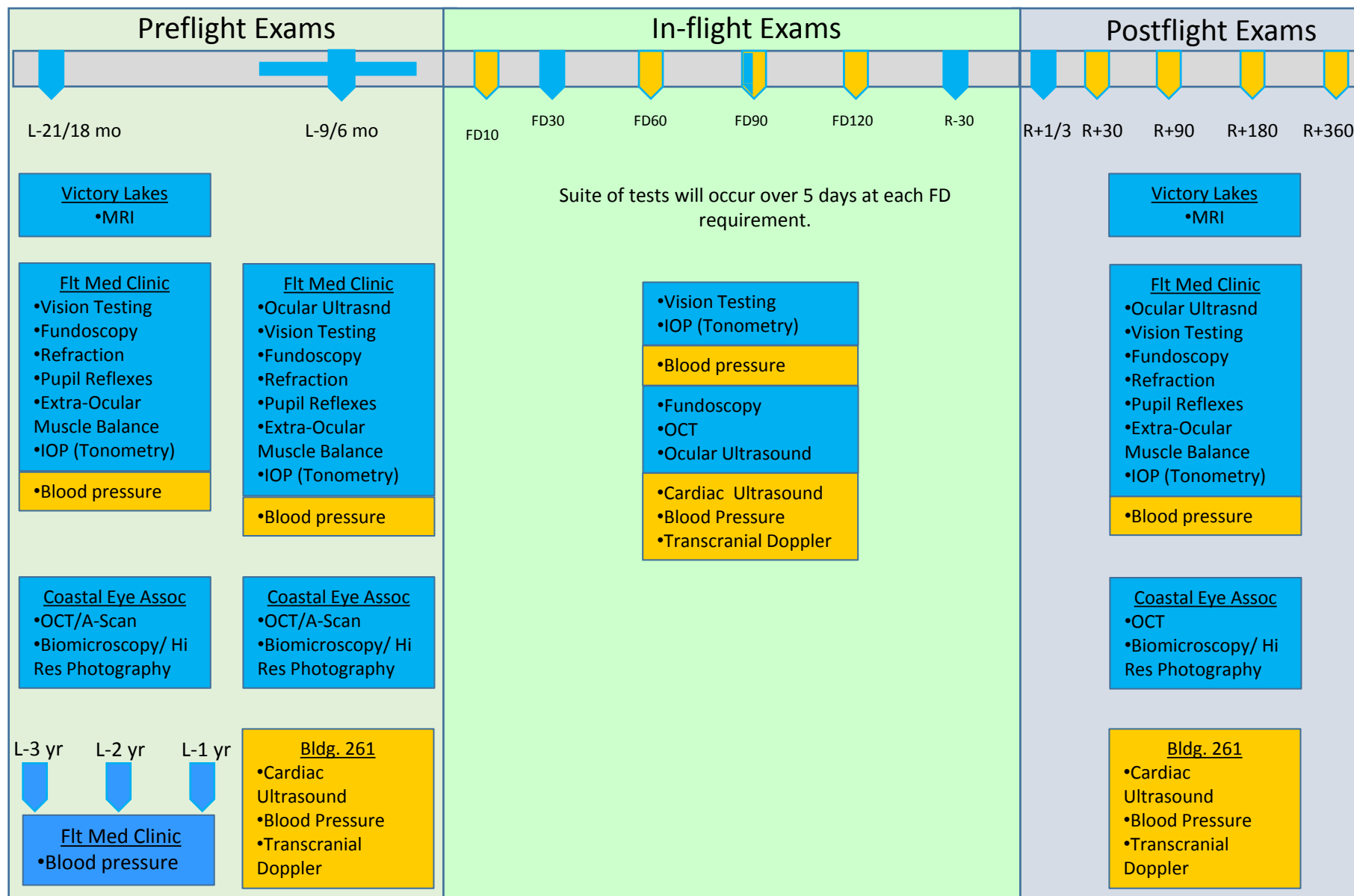




Forward Work



- Continue to update these graphs
- Updates to the MRI/US distributions
- Develop evidence base
- NASA's Ocular Health Study – PI Christian Otto



Medical Activity

Research Additional Activity

Medical Session

Research Additional Session